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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,122	01/25/2006	Shu Yan Xu	7699P003	3713

8791 7590 02/18/2009

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EXAMINER	
DANG, KET D	
ART UNIT	**PAPER NUMBER**
4118	
MAIL DATE	**DELIVERY MODE**
02/18/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,122	XU ET AL.	
	Examiner	Art Unit	
	KET DANG	4118	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 January 2006*.

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

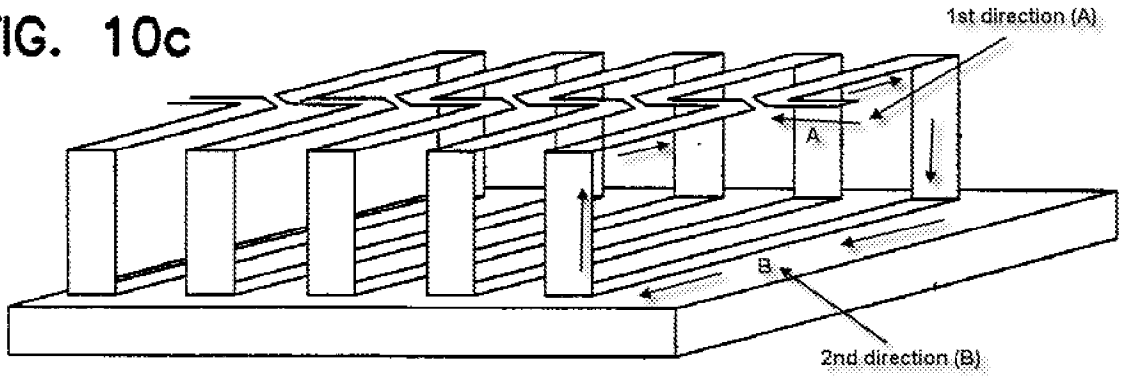
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 19, 20, 22-23, 25, 27, 29, 30-31, & 33-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Tobin et al. (US Pat No. 5,619,103).

3. Regarding claim 19, Tobin et al. disclose a method comprising: introducing a process gas (Col 6, lines 44-53) into a plasma reactor 80 (Fig.6); introducing an RF antenna (Col. 4, lines 9-16) having a first unidirectional oscillating current 250 (Fig. 20b) in a first direction (A, See figure 10c below) and a second unidirectional oscillating current in a second direction (B, See figure 10c below) inside the plasma reactor 80 (Fig. 6); and the first unidirectional oscillating RF current sheet is substantially perpendicular to the second unidirectional oscillating current sheet (See Figure 10c below for current flows either from left side or right side of the figure. It also shows the first direction (A) is perpendicular to second direction (B).) wherein the unidirectional oscillating RF currents are oscillating at a frequency range of 300 to 1000 kHz (Col 4, lines 20-21).

FIG. 10c



4. Regarding claims 20 & 22, Tobin et al. disclose further wherein the RF antenna (Col. 4, lines 9-16) having first and second unidirectional oscillating currents 250 (Fig. 20b) generate a time varying RF electrical field azimuthally shifted on 45 degree with respect to the first and second direction of the first and second unidirectional oscillating RF currents (See figures 20a/20b) (Col. 7, lines 21-34); wherein the first and second unidirectional oscillating RF currents exhibit substantially no phase differences (Since there is only one current, therefore the current has no phase differences with itself.).

5. Regarding claim 23, Tobin et al. disclose a method comprising: introducing a process gas (Col 6, lines 44-53) into a plasma reactor 80 (Fig.6): introducing a unidirectional oscillating RF current 250 (Fig. 20b) into a first plurality of current carrying conductors in a first direction (A, See figure 10c above) and a second plurality of current carrying conductors in a second direction (B, See figure 10c above) generating a time varying RF electrical field azimuthally shifted with respect to the first and second direction of the unidirectional oscillating RF currents (See Figures 20a/20b) (Col. 7, lines 21-34) and the unidirectional oscillating RF current in the first and second plurality of

current carrying conductors exhibit substantially no phase differences (Since there is only one current, therefore the current has no phase differences with itself.); wherein the unidirectional oscillating RF current is oscillating at a frequency range of 300 to 1000 kHz (Col 4, lines 20-21).

6. Regarding claim 25, Tobin et al. disclose a method comprising: introducing a process gas (Col 6, lines 44-53) into a plasma reactor 80 (Fig.6): introducing a first unidirectional oscillating RF current 250 (Fig. 20b) into a first plurality of current carrying conductors in a first direction (A, See figure 10c above); introducing a second unidirectional oscillating RF current (B, See figure 10c above) into a second plurality of current carrying conductors in a second direction; generating a time varying RF electrical field azimuthally shifted with respect to the first and second direction of the first and second unidirectional oscillating RF currents (See Figures 20a/20b) (Col. 7, lines 21-34); and the first and second unidirectional oscillating RF currents exhibit substantially no phase differences (Since there is only one current, therefore the current has no phase differences with itself.); wherein the first and second unidirectional oscillating RF currents are oscillating at a frequency range of 300 to 1000 kHz (Col 4, lines 20-21).

7. Regarding claim 27, Tobin et al. disclose a method comprising : introducing a process gas (Col 6, lines 44-53) into a plasma reactor 80 (Fig.6): introducing a unidirectional oscillating RF current 250 (Fig. 20b) into a first plurality of current carrying conductors in a first direction (A, See figure 10c above); introducing the unidirectional oscillating RF current 250 (Fig. 20b) into a second plurality of current carrying

conductors in a second direction (B, See figure 10c above); generating a time varying RF electrical field azimuthally shifted with respect to the first and second direction of the unidirectional oscillating RF currents (See Figures 20a/20b) (Col. 7, lines 21-34) and the unidirectional oscillating RF current in the first and second plurality of current carrying conductors exhibit substantially no phase differences (Since there is only one current, therefore the current has no phase differences with itself.); wherein the unidirectional oscillating RF current is oscillating at a frequency range of 300 to 1000 kHz (Col 4, lines 20-21).

8. Regarding claim 29, Tobin et al. disclose an arrangement comprising: a first plurality of substantially parallel current carrying conductors 262 (Fig. 22a) oriented in a first direction; a second plurality of substantially parallel current 264 (Fig. 22a) carrying conductors oriented in a second direction; the first and second current carrying conductors for carrying unidirectional oscillating RF currents (Col. 4, lines 9-16) in a first and second direction respectively; the first direction being substantially perpendicular (Col. 9, lines 32-35) to the second direction; the first plurality of substantially parallel current carrying conductors 262 (Fig. 22a) is disposed planarly above (Col. 9, lines 17-26) the second plurality of substantially parallel current carrying conductors 264 (Fig. 22a); and wherein the unidirectional oscillating RF current is oscillating at a frequency range of 300 to 1000 kHz (Col 4, lines 20-21).

9. Regarding claim 33, Tobin et al. disclose a plasma reactor comprising: a plasma reactor chamber 80 (Fig.6) adapted for plasma processing and for introducing of a process gas (Col 6, lines 44-53); and an RF antenna (Col. 4, lines 9-16) arrangement

comprising a first plurality of substantially parallel current carrying conductors 262 (Fig. 22a) in a first direction; a second plurality of substantially parallel current carrying conductors 264 (Fig. 22a) in a second direction; the first and second plurality of current carrying conductors for carrying unidirectional oscillating RF currents (Col. 4, lines 9-16) in a first and second direction respectively; the first direction being substantially perpendicular (Col. 9, lines 32-35) to the second direction; and the first plurality of substantially parallel current carrying conductors 262 (Fig. 22a) is disposed planarly above (Col. 9, lines 17-26) the second plurality of substantially parallel current carrying conductors 264 (Fig. 22a); wherein the unidirectional oscillating RF current is oscillating at a frequency range of 300 to 1000 kHz (Col 4, lines 20-21).

10. Regarding claims 30, 31,& 34 Tobin et al. disclose wherein the first 262 (Fig. 22a) and second 264 (Fig. 22a) plurality of substantially parallel current carrying conductors adapted to generate a time varying RF electrical field azimuthally shifted on 45 degree with respect to the first and second direction (See Figures 20a/20b) (Col. 7, lines 21-34); wherein the first plurality of substantially parallel current carrying conductors 262 (Fig. 22a) are alternately electrically coupled to the second plurality of substantially parallel current carrying conductors 264 (Fig. 22a); and wherein the first 262 (Fig. 22a) and second 264 (Fig. 22a) plurality of substantially parallel current carrying conductors are disposed inside the plasma reactor chamber 81(Fig. 14).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 21, 24, 26, & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin et al. (US Pat No. 5,619,103) in view of Rudder et al. (US Pat No. 5,643,639).

13. Regarding claims 21, 24, 26, & 28, Tobin et al. disclose the claimed invention including wherein the process gas comprises: argon (Col. 5, lines 5-8), except for nitrogen, methane, or hydrogen or a combination of any of the mentioned gases. However, Rudder et al. teach nitrogen, methane, or hydrogen or a combination of any of the mentioned gases (Col. 8, lines 23-27). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to modify the Tobin‘s reference, to include nitrogen, methane, or hydrogen or a combination of any of the mentioned gases, as suggested and taught by Rudder, for the purpose of removing residual materials deposited on the chamber surface (Col 8, lines 23-33).

14. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin et al. (US Pat No. 5,619,103) in view of Chen et al. (6,155,199).

15. Regarding claim 32, Tobin et al. disclose the claimed invention, except for wherein at least one capacitor is connected between a predetermined number of the first plurality of substantially parallel current carrying conductors and a predetermined number of the second plurality of substantially parallel current carrying for minimizing reactance. However, Chen et al teach wherein at least one capacitor C-1 (Fig 10 below) is connected between a predetermined number of the first plurality of

substantially parallel current X (See figure 10 below) carrying conductors a predetermined number of the second plurality of substantially parallel current Y (See figure 10 below) carrying for minimizing reactance (Col. 4, lines 58-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to modify the Tobin's reference, to include parallel current carrying for minimizing reactance, as suggested and taught by Chen, for the purpose of allowing the voltage to increase (Col. 4, line 65) and to decrease other elements (Col. 19, lines 49-54).

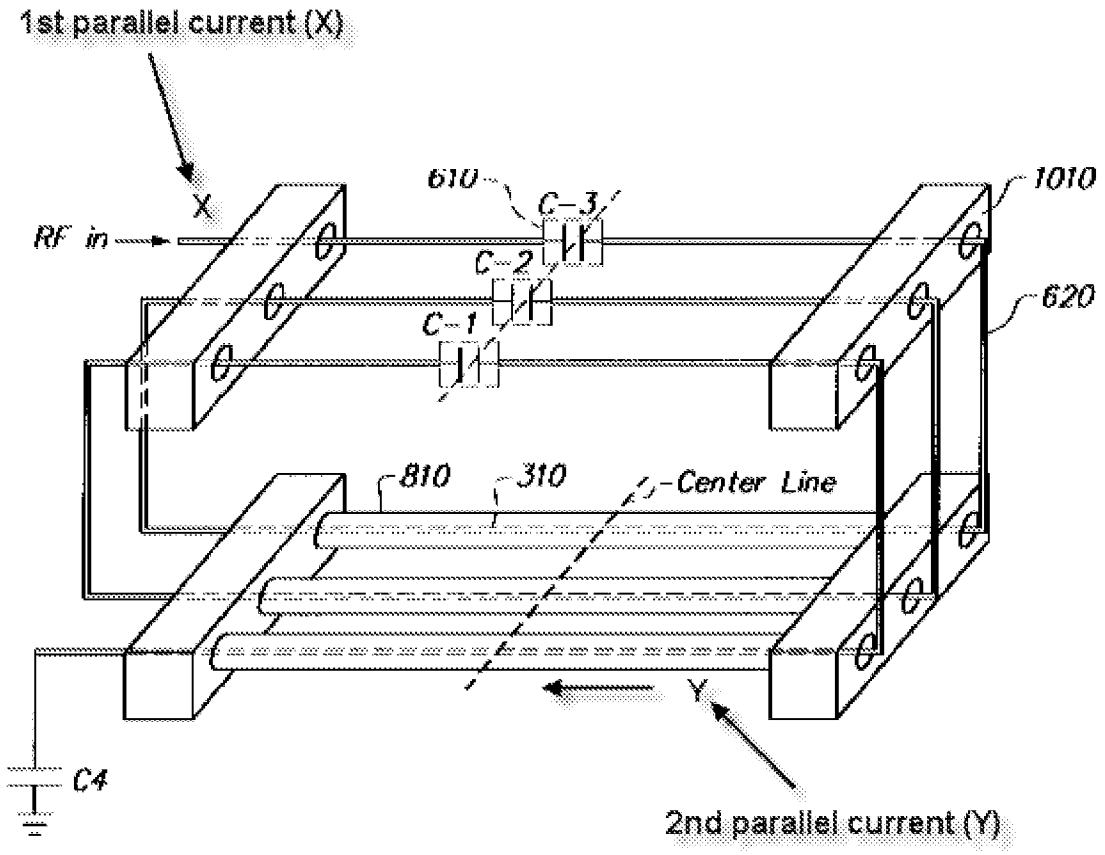


FIG. 10

16. Claims 35 & 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin et al. (US Pat No. 5,619,103) in view of Kang et al. (6,501,447 B1).

17. Regarding claims 35 & 36, Tobin et al. disclose the claimed invention including still maintain vacuum integrity of the plasma reactor chamber (Col. 12, lines 21-22), except for wherein each of the first and second plurality of substantially parallel current carrying conductors is contained inside each of a plurality of dielectric sleeves; and wherein the plasma reactor chamber is adapted to accommodate the plurality of dielectric sleeves. However, Kang et al. teach wherein each of the first and second plurality of substantially parallel current carrying conductors is contained inside each of a plurality of dielectric sleeves 44/48 (Fig. 6) (Col. 5, lines 37-44); and wherein the plasma reactor chamber is adapted to accommodate the plurality of dielectric sleeves 44/48 (Fig. 6) (Col. 5, lines 37-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to modify the Tobin's reference, to include the plurality of dielectric sleeves, as suggested and taught by Kang for the purpose of protecting film on the surface of the barrier (Col. 5, lines 45-50).

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ogle (US Pat No. 4,948,458) discloses method and apparatus for producing magnetically-coupled planar plasma. Brcka (US Pub No. 2003/0159782 A1) discloses modified transfer function deposition baffles and high density plasma ignition

therewith in semiconductor processing. Robson et al. (US Pat No. 5,874,014) disclose durable plasma treatment apparatus and method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KET DANG whose telephone number is (571)270-7827. The examiner can normally be reached on Monday - Friday, 7:30 - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quang Thanh can be reached on (571)272-4982. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quang D. Thanh/
Supervisory Patent Examiner, Art Unit 4118

/K.D./
Examiner, Art Unit 4118